U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

04-ESQ-0239

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04-WTP-251

Mr. J. P. Henschel, Project Director
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Henschel:

CONTRACT NO. DE-AC27-01RV14136 – APPROVAL OF AUTHORIZATION BASIS AMENDMENT REQUEST (ABAR) 24590-WTP-SE-ENS-03-187, REVISION 0, "REVISION OF THE SAFETY CLASSIFICATION OF THE PT IN-CELL CRANES FROM SDS/SC-II TO APC/SC-II, THE OUT-CELL CRANE FROM RRC TO APC"

Reference: BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-187, Revision 0, Revision of the Safety Classification of the PT In-Cell Cranes from SDS/SC-II to APC/SC-II, the Out-Cell Crane from RRC to APC," CCN: 085311, dated May 3, 2004.

This letter approves ABAR 24590-WTP-SE-ENS-03-187, Revision 0, submitted to the U.S. Department of Energy, Office of River Protection (ORP) by Bechtel National, Inc. (BNI) (Reference). The ABAR addresses changes to the safety classification of in-cell and out-cell cranes in the Pretreatment (PT) facility.

ORP's review of the changes proposed in the subject ABAR is summarized in the attached Safety Evaluation Report (SER). Based upon the information in the Reference letter and the attached SER, the changes are acceptable and there is reasonable assurance that the health and safety of the public, the workers, and the environment will not be adversely affected by those changes, and that they comply with applicable laws, regulations, and River Protection Project Waste Treatment and Immobilization Plant (WTP) contractual requirements. Modifications were made to the proposed changes to achieve consistency with changes currently being made to the Safety Requirements Document by ABAR 24590-WTP-SE-ENS-04-011. BNI staff have reviewed these modifications and agreed with them.

The attached SER provides final approval for the facility design changes as described in the ABAR. Specific changes proposed to the PT Preliminary Safety Analysis Report (PSAR) will receive final approval at the time of the PSAR update and changes to Chapter 2 are available for review.

This amendment is effective immediately and shall be fully implemented within 30 days. If you have any questions, please contact me, or your staff may contact Dr. Walter J. Pasciak, WTP Safety Authorization Basis Team, (509) 373-9189.

Sincerely,

Roy J. Schepens
Manager

WTP:WJP

Attachment

cc w/attach:
M. T. Sautman, DNFSB
J. M. Eller, PAC

Safety Evaluation Report (SER)
Of Proposed Authorization Basis Amendment Request (ABAR)
24590-WTP-SE-ENS-03-187, Revision 0
To the Pretreatment (PT) Facility
Preliminary Safety Analysis Report (PSAR)
For the River Protection Project Waste Treatment and Immobilization Plant (WTP)

1.0 INTRODUCTION

The WTP authorization basis is the composite of information provided by Bechtel National, Inc. (the Contractor) in response to radiological, nuclear, and process safety requirements that is the basis on which the U.S. Department of Energy (DOE), Office of River Protection (ORP) grants permission to perform regulated activities. The authorization basis includes that information requested by the Contractor for inclusion in the authorization basis and subsequently accepted by ORP. The authorization basis for the WTP includes the PT PSAR. The PT PSAR describes the analyzed safety basis for the PT facility, demonstrates that the facility will perform and can be operated such that the radiological, nuclear, and process safety requirements are met, and demonstrates adequate protection of the public, the workers, and the environment. The PT PSAR is based on the preliminary design of the PT facility and is part of the authorization basis for facility construction. ORP authorized construction of the PT based on the facility safety basis documented in the PSAR on November 13, 2002.[1]

2.0 BACKGROUND

By the letter dated May 3, 2004,[2] the Contractor submitted a proposed amendment to the PT PSAR to; (1) revise the safety classification of the PT facility in-cell cranes and associated lifting devices from Safety Design Significant (SDS)/Seismic Category (SC)-II to Additional Protection Class (APC)/SC-II; and (2) revise the safety classification of the PT facility out-cell crane from Risk Reduction Class (RRC) to APC. In the current PSAR, the unmitigated consequences to a co-located worker from dropping an ultra filter module in the C5 area or dropping a cask in the export truck bay was designated as Severity Level (SL)-1. In the current ABAR these events have been redesignated as SL-2. The new SL allows the crane to be classified as APC instead of as SDS.

Under the requirements of RL/REG-97-13, the Contractor is required to update the PSAR every two years. The amendment request submitted by the Contractor proposes changes to the PSAR that will be incorporated in the PSAR during the next biennial update. This SER documents ORP's evaluation of the detailed changes to the PSAR. The enclosed SER provides interim approval of the proposed specific changes to the PT PSAR. Final review and approval of the specific PSAR changes will be made at the time when revisions to Chapter 2 are available.

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[1] ORP letter from R. J. Schepens to R. F. Naventi, BNI, "U.S. Department of Energy (DOE) Notice to Proceed with Construction Activities," 02-OSR-0517, dated November 13, 2002.

[2] BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-187, Revision 0, Revision of the Safety Classification of the PT in-Cell Cranes from SDS/SC-II to APC/SC-II, the Out-Cell Crane from RRC to APC," CCN: 085311, dated May 3, 2004.

3.0 EVALUATION

3.1 Proposed Changes to Sections 3.4.1.1.1.5 and 3.4.1.1.1.8:

The event described in Section 3.4.1.1.1 is the drop of a plugged ultrafilter module in the C5 hot cell. The accident sequence involves lifting the module using the crane, and then a failure of the crane, hook, or grapple allows the module to fall back onto the hot cell floor. The impact of the ultrafilter module with the floor creates an aerosol that is confined to the cell and the C5 ventilation system. The proposed change to Sections 3.4.1.1.1.5 and 3.4.1.1.1.8 is to change the SL for co-located workers from SL-1 to SL-2.

Also, the table in Section 3.4.1.1.1.8 is to be modified as follows: Change the unmitigated consequences for the public receptor from 0.022 rem to 0.015 rem and change the unmitigated consequences for the co-located worker receptor from 20.96 rem to 13.99 rem. ORP reviewers observed that the unmitigated consequences for the same event were different in Sections 3.4.1.1.1.5 and 3.4.1.1.1.8. Contractor staff proposed the above changes for consistency.

Evaluation (acceptable, as modified): The unmitigated consequences to the co-located worker is 13.99 rem. In section 4.3.1, Appendix A, of the Safety Requirements Document (SRD), SL-2 is the designated level for unmitigated consequences in the range of 5 – 100 rem/event. 13.99 rem falls in this range so designating the event as SL-2 for co-located workers is appropriate and consistent with the requirements of the SRD.

3.3 Proposed Changes to Section 3.4.1.1.1.6:

ORP reviewers revised the proposed change to clarify what control strategies are for facility workers and what are for the public and co-located workers. Change the subsection titled "Selected Control Strategy" to read as follows:

"The selected control strategies for public (SL-4) and co-located workers (SL-2) are:

- Hoisting equipment shall be designed to prevent load drops or crane collapse (APC)
- C5 ventilation exhaust will be filtered to acceptable limits prior to discharge to the environment and must withstand potential moisture challenges (SC[3])

The selected control strategies for facility workers (High consequences) are:

- Hoisting equipment shall be designed to prevent load drops or crane collapse (APC)
- C5 ventilation systems will be designed to maintain cascade airflow from areas of lower contamination to areas of higher contamination (SS)
- Radiation protection program."

Evaluation (acceptable, as modified): The control strategies for the public and facility workers are consistent with the requirements of the SRD. For SL-4 events to the public, the SRD, Appendix B, requires a physical design feature or an administrative control. The above control

[3] Because the SRD, Appendix B requires two physical barriers for SL-2 events to co-located workers, and only one physical barrier exists, i.e., the C5 ventilation system, the SSC classification of the C5 ventilation system will be SC. See evaluation for this section.

strategies meet this requirement. For High consequence events to the facility workers, the SRD, Appendix B, requires at least one barrier. As indicate above, three barriers exist.

For SL-2 events to the co-located worker, the SRD, Appendix B, requires two independent physical barriers. Only one physical barrier exists which is the C5 ventilation system. The crane and grapple system represent a physical design feature. The SRD provides an alternate strategy where the requirement of two independent physical barriers is not met. The SRD states that "(h)azard control strategies that do not meet these minimum requirements shall be approved using the Contract-approved methodology for making such changes." The Contract-approved methodology for making changes is described in RL-REG 97-13[4] and requires a safety evaluation that justifies the change. This change is justified on the basis that the structures, systems, and components (SSC) classification of the cell and C5 ventilation system for this event, as it relates to co-located worker protection, is required to be APC, but they will be designated SC. The Contractor proposed that the SC SSC designation of the cell and C5 ventilation system, coupled with the physical design features of the crane/grapple system are equivalent to two physical barriers for this event. ORP staff agreed with this conclusion.

3.4 Proposed Changes to Section 3.4.1.1.2.5:

The event described in Section 3.4.1.1.2 is the drop of a cask during transfer from the loading area to the export truck bay. The accident starts by lifting the cask using the out-cell crane. The cask is lifted to the maximum height and then a failure of the crane, rigging, hook, or grapple allows the cask to fall onto the truck export bay floor. The proposed change to Sections 3.4.1.1.2.5 and 3.4.1.1.2.8 is to change the SL for co-located workers from SL-1 to SL-2.

Also, the table in Section 3.4.1.1.2.8 is to be modified as follows: Change the unmitigated consequences for the public receptor from 0.022 rem to 0.015 rem and change the unmitigated consequences for the co-located worker receptor from 20.96 rem to 13.99 rem. ORP reviewers observed that the unmitigated consequences for the same event were different in Sections 3.4.1.1.2.5 and 3.4.1.1.2.8. The change corrects the inconsistency.

Evaluation (acceptable, as modified): The unmitigated consequences presented in Section 3.4.1.1.2.5 and 3.4.1.1.2.8 is 13.99 rem to the co-located workers. In section 4.3.1, Appendix A, of the SRD, SL-2 is the designated level for unmitigated consequences in the range of 5 -- 100 rem/event. 13.99 rem falls in this range so designating the event as SL-2 for co-located workers is appropriate and consistent with the requirements of the SRD.

3.5 Proposed Changes to Section 3.4.1.1.2.6:

Change the section titled "Selected Control Strategy" to read as follows:

"The selected control strategies for public (SL-4) and co-located workers (SL-2) are:

[4] "Office of River Protection Position on Contractor-Initiated Changes to the Authorization Basis," RL/REG 97-13, Rev. 10, U.S. Department of Energy, Office of River Protection, December 2003.

- Solid waste casks and drums are designed to provide shielding and maintain confinement when dropped from the maximum credible lift height (SDC[5])
- Hoisting equipment shall be designed to prevent load drops or crane collapse (APC)

The selected control strategies for facility workers (High consequences) are:

- Solid waste casks and drums are designed to provide shielding and maintain confinement when dropped from the maximum credible lift height (SDC)
- Hoisting equipment shall be designed to prevent load drops or crane collapse (APC)
- Radiation protection program"

Evaluation (acceptable, as modified): The control strategies for the public and facility workers are consistent with the requirements of the SRD. For SL-4 events to the public, the SRD, Appendix B, requires a physical design feature or an administrative control. The above control strategies meet this requirement. For High consequence events to the facility workers, the SRD, Appendix B, requires at least one barrier. As indicate above, three barriers exist.

For SL-2 events to the co-located worker the SRD, Appendix B, requires two independent physical barriers. Only one physical barrier exists which is the cask and drums. The crane and grapple system represent a physical design feature. The SRD provides an alternate strategy where the requirement of two independent physical barriers is not met. The SRD states that "(h)azard control strategies that do not meet these minimum requirements shall be approved using the Contract-approved methodology for making such changes." The Contract-approved methodology for making change is described in RL-REG 97-13[6] and requires a safety evaluation that justifies the change. This change is justified on the basis that the SSC classification of the cask and drums for this event, as it relates to co-located worker protection, is required to be APC, but they will be designated as SDC SSCs (Table 4A-1). The Contractor proposed that the SDC SSC designation of the cask and drums, coupled with the physical design features of the crane/grapple system are equivalent to two physical barriers for this event. ORP staff agreed with this conclusion.

3.6 Proposed changes to Table 3A-8 and proposed addition of Table 3A-8A:

The classification of in-cell cranes and lifting devices is being changed from SDS to APC. The classification of out-cell cranes and lifting devices is being changed from RRC to APC. Specifically, Item 14 in Table 3A-8 is to be deleted which is the designation of out-cell cranes as RRC. Item 14 is being moved to Table 3A-8A, which is the facility out-cell crane entry. Both in-cell cranes and out-cell cranes are being lumped into a single category in Table 3A-8A below.

In discussions between ORP reviewers and Contractor staff, the proposed new Table 3A-8A was determined to be modified as follows:

[5] Because the SRD, Appendix B, requires two physical barriers for SL-2 events to co-located workers, and only one physical barrier exists, i.e., the casks and drums, the SSC classification of the casks and drums will be required to be designated SC. See evaluation for this section.

[6] "Office of River Protection Position on Contractor-Initiated Changes to the Authorization Basis," RL/REG 97-13, Revision 10, U.S. Department of Energy, Office of River Protection, December 2003.

Table 3A-8A: PT APC Items

SSC	APC FUNCTION
Cranes and Lifting devices	Minimize Load Drop during normal operations 1. Cranes will prevent overtravel in hoist, cross travel and long travel directions. 2. The cranes must maintain loads in the event of a power failure. 3. On loss and subsequent re-application of power the crane will not automatically re-initiate movement. 4. Grapples will be designed to prevent inadvertent release of suspended loads and prevent lifting in a partial closed or open position.

The proposed table had only one row, designated "cranes and lifting devices". The table was modified to specifically provide detailed functional requirements for APC cranes.

Evaluation (acceptable, as modified): The designation of in-cell and out-cell cranes as APC SSCs is consistent with the changes approved in Sections 3.2 and 3.4 of this SER. The evaluations in Sections 3.2 and 3.4 demonstrate that the control strategies meet SRD requirements when these cranes and lifting devices are designated as APC SSCs.

Addition of Table 3A-8B:

In discussions between ORP reviewers and Contractor staff, new Table 3A-8B was determined to be included with these changes. The table is as follows:

Table 3A-8B: Seismic Design Requirements for APC SC-II Cranes

SC-II SSC	Design Requirements/Standards
Overhead and Underhung Cranes Crane Plant item numbers include: 1. 24590-PTF-MJ-PIH-CRN-00004 2. 24590-PTF-MJ-PFH-CRN-00002 3. 24590-PTF-M0-RWH-CRN-00012	The cranes and all major crane components must remain in place during and following a seismic event. These cranes will be designed to CMAA 70-2000, Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes (supplemented with ASME NOG 1-2002, Sections NOG-1140, NOG-4150, NOG-5482 and NOG-6150). CMAA 74-2000, Specifications for Top Running and Under Running Single Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist (supplemented with ASME NUM 1-2000 [with NUM la-20021], Sections NUM-G2000, NUM-II-7000, NUM-II-8200, NUM-II-8300, and NUM-II-8400). The crane rails will be designed and constructed to maintain loads, including during a seismic Design Basis Event (DBE) in accordance with ANSI/AISC N690.

SC-II SSC	Design Requirements/Standards
	The rails will be anchored to the structural concrete in accordance with ACI 349 (embedded plates) or ANSI/AISC N690 (structural steel).

Evaluation (acceptable, as modified): The design requirements in the above table for APC SC-II cranes are acceptable because they are consistent with the requirements for SDS SC–II cranes, except that the applicability of NOG-6120b has been excluded. This is acceptable because the only seismic protection required of these cranes is to ensure that the cranes do not fall in a seismic event, whereas the load may fall.[7] ORP reviewers examined the calculation and found it acceptable. NOG-6120b has to do with the seismic shutdown switch for preventing the load from dropping in a seismic event. The three cranes listed in the above table are the only ones that can fall on SC-I systems in a seismic event (CCN: 102783).

3.7 Proposed Changes to Section 4.4.7, title:

The Contractor proposed to change the title of this section from Cranes, Lifting Devices, and Cable Reel Flame Barriers" to "Cable Reel Flame Barriers."

3.8 Proposed Changes to Section 4.4.7.1, "Credited Safety Function":

The Contractor proposed to delete the text stating that the credited safety function of cranes and lifting devices is to not fall or drop equipment of the crane during a seismic event.

3.9 Proposed Changes to Section 4.4.7.2, "System Description":

The Contractor proposed to delete the paragraph in this section that addressed overhead cranes.

3.10 Proposed Changes to Section 4.4.7.3, "Functional Requirements":

The Contractor proposed to delete the references in this section to cranes and lifting devices.

3.11 Proposed Changes to Section 4.4.7.4, "Standards":

The Contractor proposed to delete the text of this section because it only referred to cranes and lifting devices.

3.12 Proposed Changes to Section 4.4.7.5, "System Evaluation":

The Contractor proposed to delete the text in this section referring to crane components damaging SDC SSCs during a seismic event.

3.13 Proposed Changes to Section 4.4.7.6, "Controls (TSRs)":

The Contractor's proposed to delete reference to cranes, and lifting devices.

[7] The Contractor performed a calculation which postulates the Hot Cell crane drops its load during a seismic event and demonstrates the mitigated consequences are acceptable. This calculation is contained in 24590-PTF-Z0C-W14T-00031

Evaluation of SER Sections 3.7 through 3.13 above (acceptable): The changes to the above section are acceptable. Cranes and lifting devices that are APC/SC-II for the purpose of providing seismic protection are described in Chapter 3 of the PSAR. Their safety function, functional requirements and standards are listed in Table 3A-8A and 3A-8B.

3.14 Proposed Editorial Changes:

Editorial changes are proposed to the following areas: Section 3.4.1.1.1.6, "Credited SSCs" discussion; Section 3.4.1.1.1.6, "Defense in Depth Requirements" discussion; Section 3.4.1.1.2.6, "Defense in Depth Requirements" discussion; Table 3A-13, title; and Table 4A-2, "Cranes" listing. These editorial changes are for consistency with other changes proposed in the ABAR.

Evaluation (acceptable): The editorial changes are acceptable because they are consistent with the changes approved in Sections 3.1 through 3.5 of this SER.

Proposed changes to Section 4.5 "Codes and Standards":

The Contractor proposed to delete the following references: ASME NOG-1, ASME NUM 1, and CMAA 70.

Evaluation (acceptable): This change is acceptable because these items have been moved to Table 3A-8B.

4.0 CONCLUSION

On the basis of the considerations described above, ORP has concluded the proposed change does not create a new DBE or cause an increase in the frequency or consequence of the analyzed DBEs. Though the proposed change to the PT PSAR does constitute a change in commitment relative to the design, construction, and operation of Important to Safety SSCs, the change continues to comply with applicable laws and regulations and conform to top-level standards. Accordingly, the proposed changes, as modified, in ABAR 24590-WTP-SE-ENS-03-187, Revision 0, are acceptable and ORP interim approves the specific PSAR changes.